Naval Research Laboratory

Stennis Space Center, MS 39529-5004

NRL/MR/7440--01-8257

Digital Mapping, Charting, and Geodesy Analysis Program: Technical Review DLA Electronic Catalog of NIMA Products Prototype 1

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February 22, 2001

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (*Leave Blank*)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	February 22, 2001	Memorandum Report

4. TITLE AND SUBTITLE

Digital Mapping, Charting, and Geodesy Analysis Program: Technical Review DLA Electronic Catalog of NIMA Products Prototype 1

5. FUNDING NUMBERS

PE-0603704N
PN-R1987

6. AUTHOR(S)

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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Naval Research Laboratory
Stennis Space Center, MS 39529-5004

8. PERFORMING ORGANIZATION REPORT NUMBER

NRL/MR/7440--01-8257

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

SPAWAR
4301 Pacific Highway
San Diego, CA 92110-3127

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT (*Maximum 200 words*)

Automating the selection and ordering process for digital and hardcopy, mapping, charting and geodesy (MC&G) products provided by the National Imagery and Mapping Agency (NIMA) is expected to simplify and accelerate a previously complex task. The replacement of a voluminous paper catalog with a geospatially oriented CD-ROM interface should facilitate the user's ability to identify an area of interest, select appropriate data products, and initiate a formal request to the Defense Logistics Agency (DLA). The development of this CD-ROM-based catalog would also provide a technical basis for encouraging future efforts for hosting this information in an on-line mode on the World Wide Web or in a secure network environment. Toward these efforts, DLA recently presented an "Electronic Catalog of NIMA Products Prototype 1" for technical review. This potentially effective blend of multimedia materials, advanced database techniques, and Geographic Information System (GIS) technology meets much of its intended purpose of eliminating the paper stack currently required to catalog NIMA products. As the Navy's lead laboratory in MC&G, the Naval Research Laboratory (NRL) recently examined this prototype in response to a formal request of evaluation from the Oceanographer of the Navy (N096). The results and key points of that evaluation are presented in this report.

14. SUBJECT TERMS

Paper catalog	Geospatially	CD-ROM interface
Based catalog	On-line mode	Multimedia materials

15. NUMBER OF PAGES

36

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std 239-18
298-102

Technical Review of DLA Electronic Catalog of NIMA Products Prototype 1

Table of Contents

DMAP Technical Review of the DLA Electronic Catalog of NIMA Products Prototype 1

1.0 Background

One of the functions of the Defense Logistics Agency (DLA) is to provide a supply channel for maps and charts to the DoD users. Currently the user is provided with a set of printed map index sheets that are used to obtain the appropriate product (i.e., stock) number when placing an order with DLA for maps. This set of index catalogs consist of:

Part 1 – Aeronautical Products Catalog and Bulletins
Part 2 – Hydrographic Products Catalog and Bulletins
Part 3 – Topographic Products Catalog and Bulletins
Part 4 – Target Material Products
Part 5 – Submarine Navigational Products
Part 6 – Special Purpose Crisis Catalogs
Part 7 – Digital Data Products Catalog
    Volume I – Terrain, Feature and Vector Product Data
    Volume II – (cancelled)
    Volume III – ARC Digitized Raster Graphics (ADRGs)
    Volume IV – Controlled Image Base (CIB) Products (cancelled)
    Digital Data Products Quarterly Bulletin

The Electronic Catalog of NIMA products is intended to replace the above paper catalogs with a CD-ROM containing an appropriate database and application software to facilitate ordering.

2.0 General Discussion

The primary viewing tool used to investigate the data was Environmental Systems Research Institute, Inc.'s (ESRI) ArcExplorer software package provided on the distribution CD-ROM. Additionally, ArcView 3.2 was also available in the Lab and was tried as well. It was expected that most of the users of this Electronic Catalog will not have ArcView and thus will be required to use the version of ArcExplorer provided on the distribution CD. For this reason the primary evaluation emphasis was placed on ArcExplorer.

An obvious question to be posed in this evaluation must address why the Catalog Prototype is limited to CD-ROM. Among its many benefits, the Internet has been proved to facilitate information exchange, encourage broader audience participation, and simplify the learning process for new information users. The combination of the Internet and spatial data (i.e., spatial web) when coupled with appropriate standards, offers a

Manuscript approved January 4, 2001.

unique information product-driven learning experience (Hecht, L.,, (Sep 2000). "Standards drive the spatial web worldwide," *GeoWorld* Vol. 13, No. 9, ppg. 46-5, Adams Business Media, Danvers, MA. While the efforts put into this Prototype are admirable, a multi-directional approach including the World-Wide Web might be more advantageous to the growing demand for timely dissemination of hardcopy and digital Mapping, Charting & Geodesy Products. However, it is also noted that the hyperlinks, while currently pointed to the local CD-ROM, could just as easily pointed to locations on the web. So this point may have already been considered. Additionally, not all users will have access to high speed Internet, making the CD-ROM a workable solution.

Many DoD personnel can relate to working with the bulky multi-voluminous hard copy catalogs, or running a somewhat unintuitive Get-a-Map software, along with making repeated calls to NIMA for assistance in identifying what data coverage exists for a given AOI. One might guess that the purpose of the Digital Catalog is to eliminate the steps required to identify maps, charts and data, while also making the ordering process as digitally simple as today's technology affords. Unfortunately, the Catalog Prototype accomplishes neither of these functions. Three specific problems are apparent with the Prototype: 1) the focus remains on an individual product level, 2) the product ordering process has been kept separate from the product identification process, and 3) the approach ignores the advantages of the digital information exchange available via the Internet.

The catalog should be up-to-date with the map products available to the Services. Also, if this is to be a monthly release, all CADRG Supplemental Update Disks and monthly DAFIF releases should also be included in this catalog.

2.1 Installation/Start Up

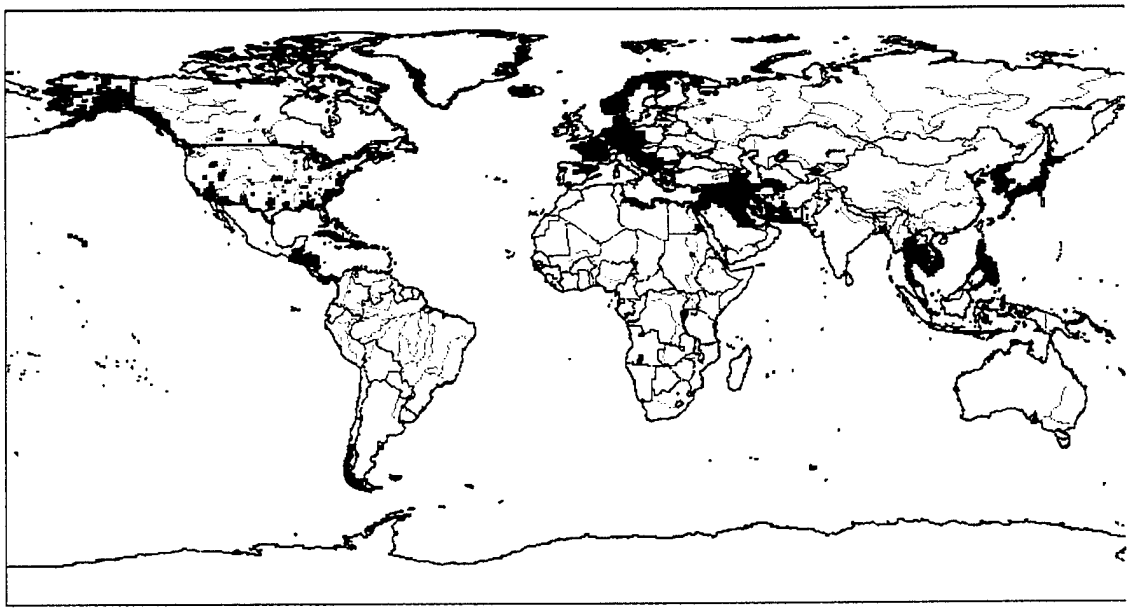
In examining the CD-ROM, the startup page seems to have problems unless Microsoft Internet Explorer defaults are set in the system control panel. Although the instructions recommends the use of Internet Explorer, this limits the ability of other browser user's for having an automated startup of the software. Since this effort is supportive of a wide variety of users, consideration should be given to modifying the startup shell to detect a user's default web browser and run in a manner that accommodates more than one type of user.

2.2 A Practical Test

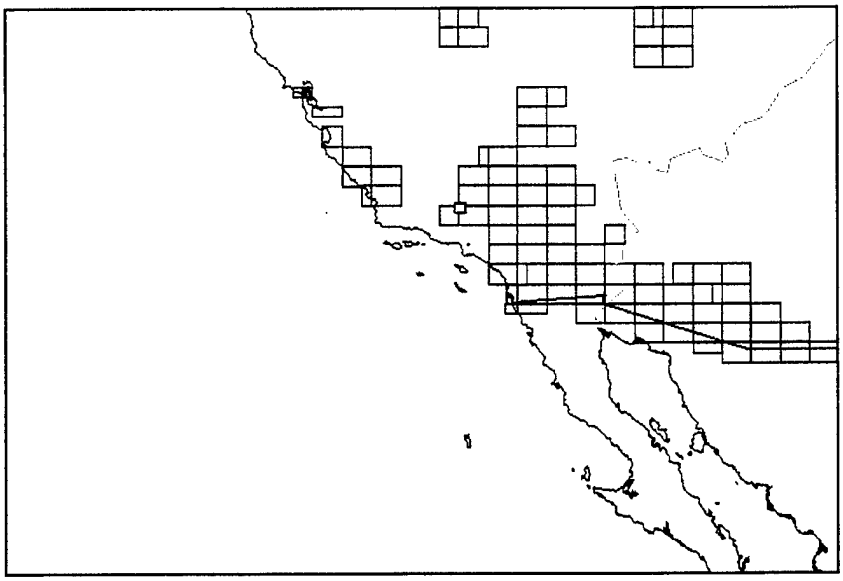
The prototype was used to compare the "old way" (i.e., paper index) with the new CD-ROM method. DMAP was recently tasked to obtain data for an upcoming Marine Corps / Army exercise. The areas of interest (AOIs) were Camp Pendleton, 29 Palms, and El Centro, California. The data requested were ADRG 1:50s and 1:100s. The manual methodology was to locate the three areas by lat/long coordinates using an atlas. Then to take the coordinates to the ADRG catalog Part 7, Volume III (CATP7V03) dated 1 April 1995 to visually locate the AOIs and identify the associated CD stock numbers. Once the

stock numbers were identified the NIMA / DLA DAMES program was used to order the identified products.

The following paragraphs take you through the digital method used by the Electronic Catalog. The Prototype CD was installed and ARC7 Digital Products selected by zooming in to the AOI. Using ArcExplorer the following screens take the reader through the process:

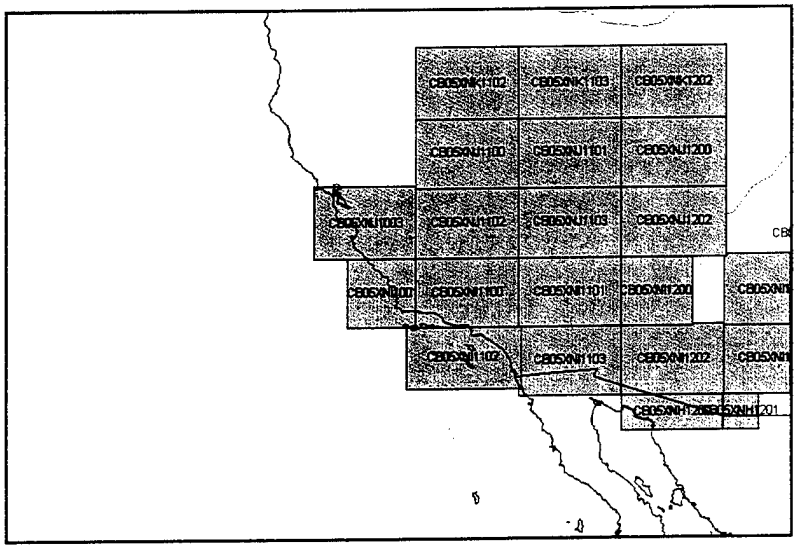


The countries, coastlines, cities, rivers, lakes were all automatically displayed, and in an order that the baselines were drawn first and the features drawn after.



After zooming in to the AOIs and using the lat/long (shown below the image in the ArcExplorer toolbar), you can hover over the polygons to obtain the stock number. (However, as noted elsewhere in this review, the number provided by hovering was not always the same as the label).

Or, you can go into the software, turn on the label for stock numbers, and zoom in to easily obtain the ARDG ARC7 (1:50K) CD stock numbers.

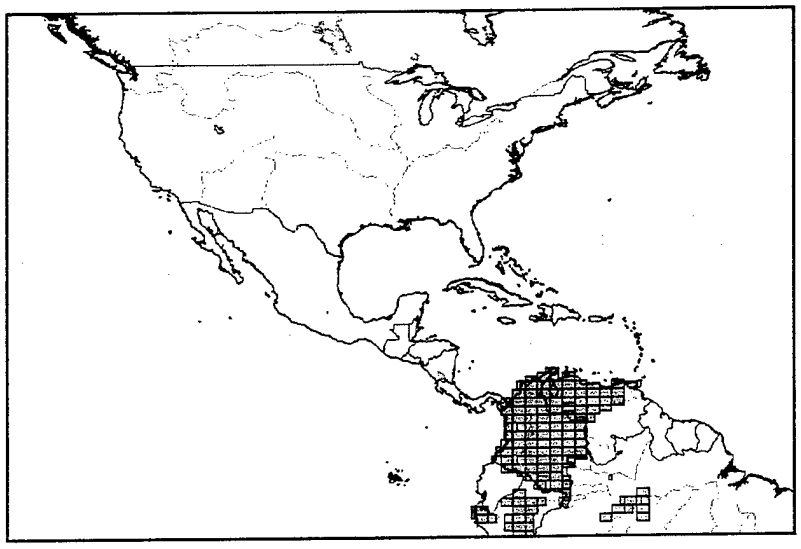


It was discovered that the ArcExplorer "Map Tool Tip" could be set by the user to any feature attribute.

There is some overlap in labels, especially if drawn to a smaller scale. This was expected.

To truly pinpoint the exact locations within the stock numbers, the lat/long coordinates would have to be used. The lat/long coordinates are located on the bottom left of the ArcExplorer screen, directly below the image.

As can be seen by this figure, there are no ADRG 1:100s (ARC6) available in the U.S. (for comparison, note the ARC6 available in South America).



Also note the lack of coding for the Great Lakes (e.g., not coded as Lakes). This error appeared in several coverages as displayed by ArcExplorer.

Summary of Manual vs. Digital Methods

This digital system was definitely easier to use and more user-friendly than the manual catalogs. However, the method remained the same: locate the AOI and/or lat/long coordinates, go to each of the product catalogs (manuals or CD), jot down the stock numbers and use the DAMES software to order the data from DLA or NIMA. The CD would replace multiple volumes of hardcopy catalogs and this would be a great improvement, especially for those on ship.

As we see it, the big plus of the digital method is that it provides a mechanism to go forward with the digital automation process. If only given the choice of one method (assuming the CD has all available data), DMAP would prefer to use the digital method.

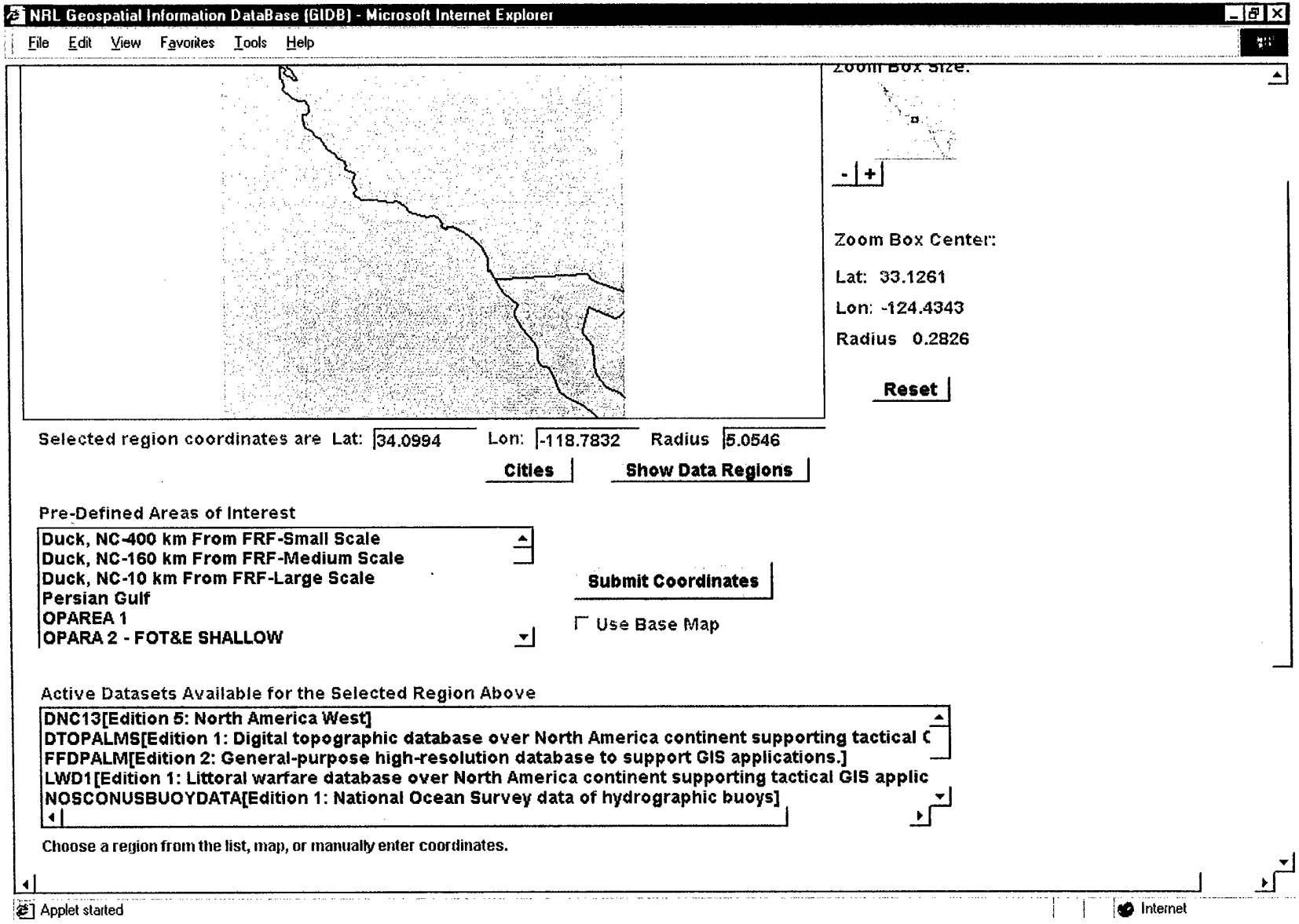
Software Add-Ons Recommended

At the present time this prototype allows the user to obtain stock numbers (among other numbers) necessary to order the NIMA data products. The DLA cover letter for Electronic Catalog says: "ArcExplorer software allows the user to search and identify required products and cut and paste results to an Excel spreadsheet." This would only provide a means to jot down the stock numbers in digital form. However, it is strongly urged that work continue to automate the process through product ordering (i.e., product stock numbers are selected individually and automatically input into mechanism of collection to order and one order placed.)

It is also highly recommended to offer an AOI approach as well as lat/long data selection to obtaining data availability information. This would allow the user to zoom into an AOI and the available data for that region would be displayed for user selection.

The following figure is a sample of the NRL Geospatial Information Database showing the California AOI. Before getting to this view an image similar to that of Figure 1 was presented and the user zoomed in to the California AOI. Within just a few moments this screen was presented showing lat/long coordinates, any predefined AOIs, and the Active Datasets applicable to the AOI that are currently loaded into the GIDB.

For the purposes of the Electronic Catalog, using this approach to show the applicable stock numbers (and/or any other information in the database) would be a great enhancement. The concept would be further enhanced if the user were able to double click on the stock number and have it saved in an appropriate manner to allow automatically electronic transfer to an ordering schema, preferably via the Internet.


NRL Geospatial Information DataBase (GIDB) - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Zoom Box Size:
- +
Zoom Box Center:
Lat: 33.1261
Lon: -124.4343
Radius 0.2826
Reset
Selected region coordinates are Lat: 34.0994 Lon: -118.7832 Radius 5.0546
Cities
Show Data Regions
Pre-Defined Areas of Interest
Duck, NC-400 km From FRF-Small Scale
Duck, NC-160 km From FRF-Medium Scale
Duck, NC-10 km From FRF-Large Scale
Persian Gulf
OPAREA 1
OPARA 2 - FOT&E SHALLOW
Submit Coordinates
Use Base Map
Active Datasets Available for the Selected Region Above
DNC13[Edition 5: North America West]
DTOPALMS[Edition 1: Digital topographic database over North America continent supporting tactical
FFDPALM[Edition 2: General-purpose high-resolution database to support GIS applications.]
LWD1[Edition 1: Littoral warfare database over North America continent supporting tactical GIS applic
NOSCONUSBUOYDATA[Edition 1: National Ocean Survey data of hydrographic buoys]
Choose a region from the list, map, or manually enter coordinates.
Applet started
Internet

2.3 Control Hierarchy and User Interface

The structure of control assumes that the user will be interested in primarily one of the following areas: aeronautical, hydrographic, topographic, or digital. From this top level the user then proceeds down a logical tree until the final product series or general geographic region is selected.

At a first cut this appears to be a logical way to approach the problem, especially if you are a map producer. However, if you are a user, your approach to selecting a cartographic product will be just the opposite. The user will first define a geographical region and then select a product that covers this region with his needed data. Thus from a users point of view the selection hierarchy is upside down.

While not that significant for "single service" operations, this inverted hierarchy becomes quite tedious for joint operations. It is, in this case, where the operations area is first defined and all pertinent maps and charts obtained that fall within the AOI. With the current structure obtaining all products for a joint operation would be tedious and error prone. In light of the fact that with increased emphasis on littoral operations, joint operations are the rule rather than the exception. Thus an "inverted" hierarchy, and not the present structure, would better meet the needs of the user.

It is suggested that the ArcExplorer interface be customized to permit the specification of an area of interest by one of several methods:

1. Manual entry of latitude and longitude coordinates of a bounding box.
2. Entry via windows-interactive box draw.
3. Entry by country name.
4. Entry by semi-automatic generalized polygon drawing.

The first two methods are requested at a minimum and the last two as permitted.

The interface would then form the logical intersection of the AOI and the bounding rectangles of all NIMA products to generate a "selected" subset of all products from which the user could subsequently chose. The generation of the selected set could become computationally burdensome if sufficient spatial index files are not available.

Additional selection methods could also be provided. Frequently the user may wish to select all charts along a planned flight path or sailing track. In this case the selected list would be generated by finding all charts that contain any portion of the planned navigational route. This track might be specified by the manual or machine-aided establishment of the beginning and end points as well as possible waypoints along the route.

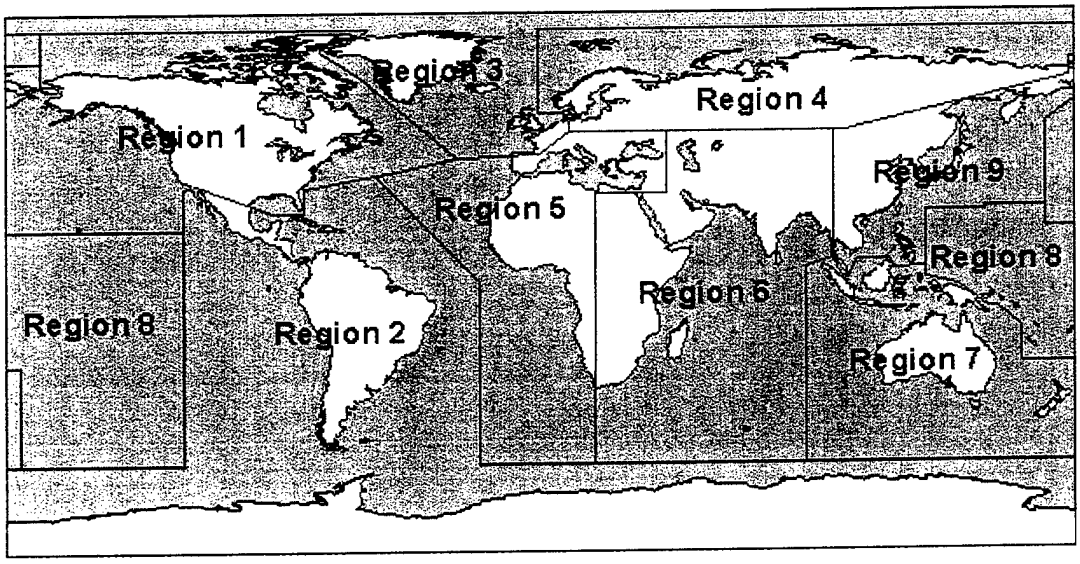
While ArcExplorer is "free" it does not have the desired capability. This would suggest that the "free" ArcExplorer would need to be customized for this application or other software tools investigated that could meet the end-user needs.

2.4 A Brief Review of the Products Provided in the Prototype

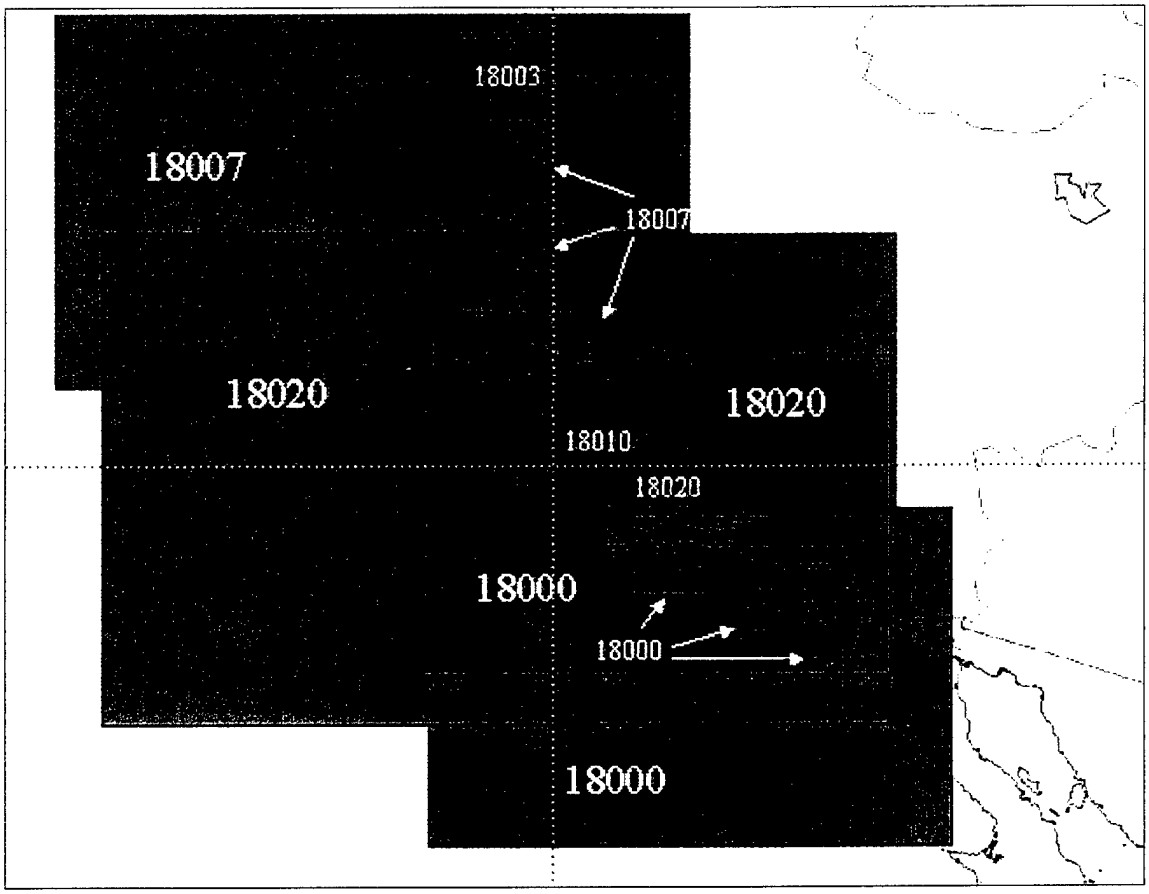
Once the task of locating ARC6 and ARC7 data available for the specified AOI in Southern California was complete, we continued looking at other available data. A more thorough review of the product series was performed in order to note any discrepancies found. The following figures present findings and comments of this further review.

2.4.1 Hydrographic Products

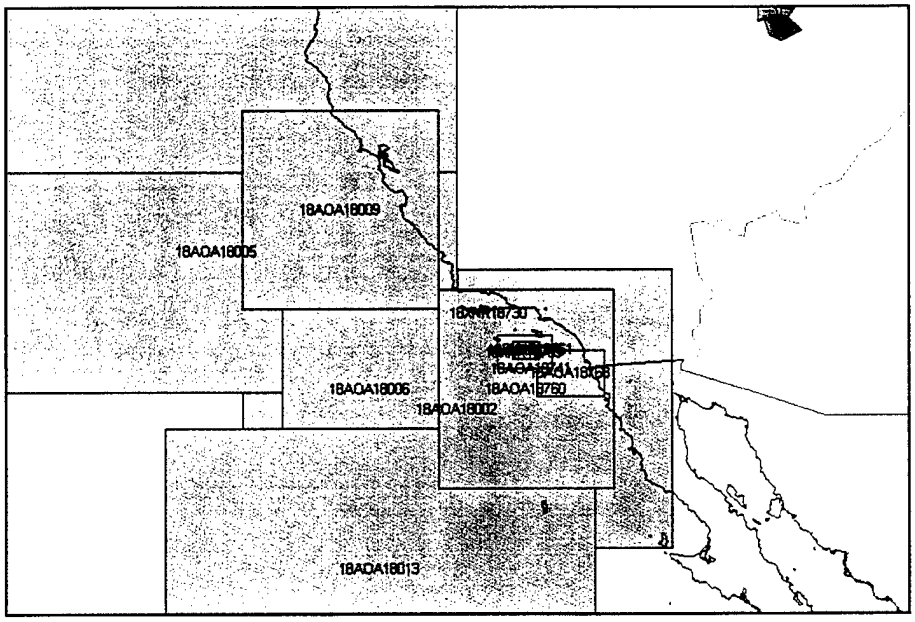
NIMA Hydrographic Products are divided into regions and each region has a maximum of three sections: Coastal Charts, Harbor/Approach Charts, and Special Charts. Each region was reviewed for accuracy and completeness (see Section 3.2.1).



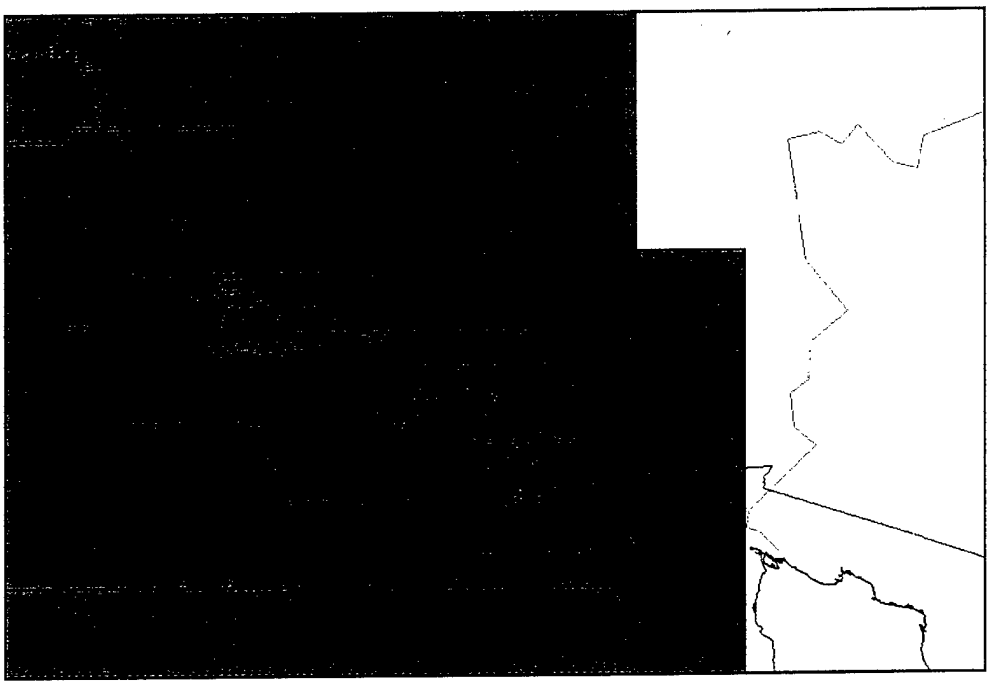
In reviewing the Region 1 coastal charts, special charts (and to a lesser degree in the harbor charts), a problem was noted for polygons that were on top of other polygons. In ArcExplorer if you hover over the uppermost polygon you get the stock number of the polygon underneath. You have to physically turn on the stock number labels in order to assure the accuracy of the corresponding polygon (as shown in example below from Region 1, Coastal Charts.) Note the yellow stock numbers on the figure. These are what show when you hover over the polygon. The black printed numbers are the stock number labels (difficult to read but you can tell they are different).



The next figure shows Region 1S, zoomed into the AOI in order to read the stock numbers. Below that is Region 1C.

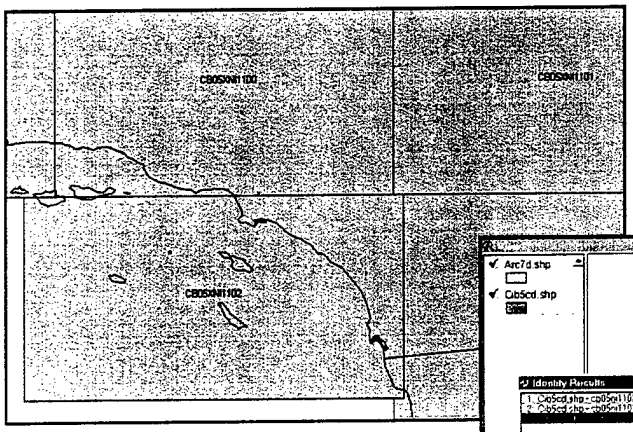


It is very difficult to read the stock numbers, but the view can be zoomed in (whereas the hardcopy catalog does not offer this feature).

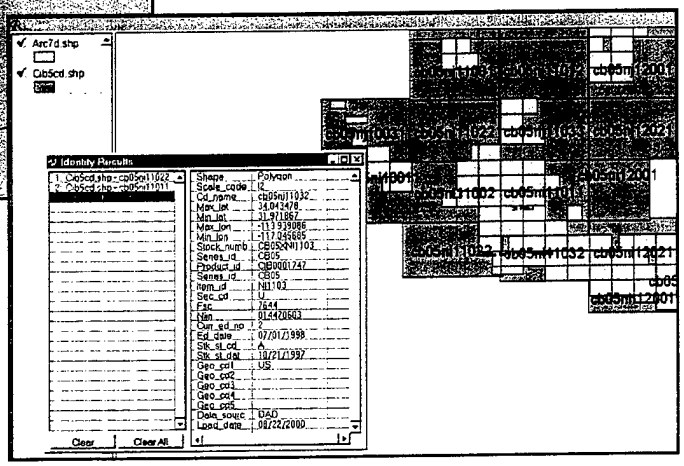


2.4.2 Digital Products

One aspect of using the ArcExplorer was that when you overlayed an additional data theme over another data theme the first data is no longer in view. For comparison, CIB data (with labels for the stock numbers) was overlayed over the ARC7; with the scale zoomed in to show the labels. (In contrast, while using ArcView 3.2, the data was still visible.) A recommendation would be to investigate duplicating the ArcView scenario within ArcExplorer.



Here you can no longer see the ARC7 data displayed in the ArcExplorer version.

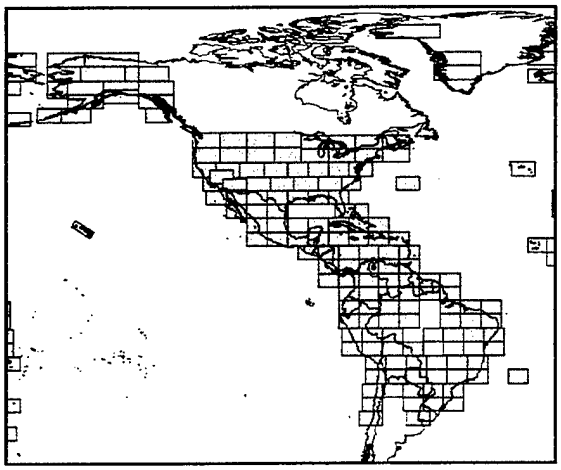


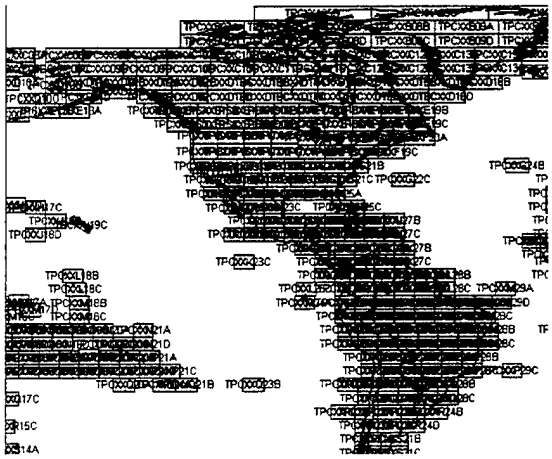
For comparison, the ArcView version displays both data products at once (the khaki green is ARC7 and the blue is CIB).

The following figures give the reader a feel for how the digital data was presented within ArcExplorer and any particular comments regarding the data.

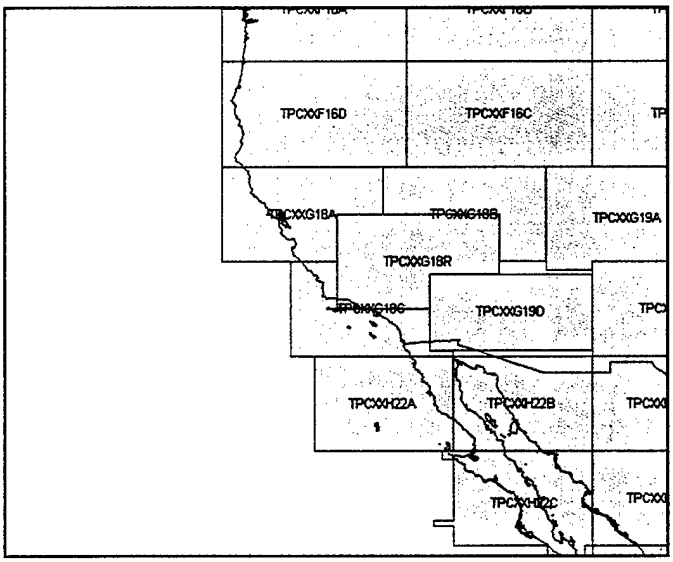
ARC2

It would appear that from this image there is no ARC2 data available for parts of Canada.



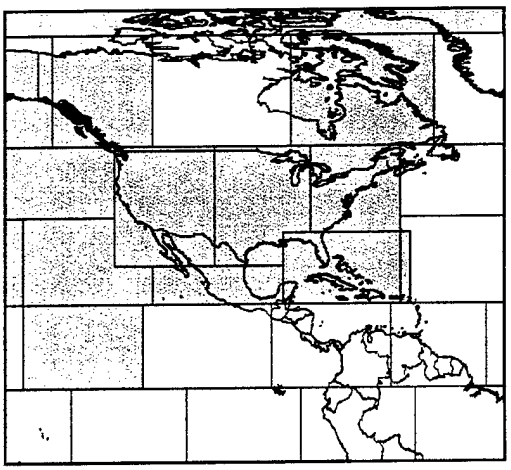


However, when the labels are added the area is filled in with color and blocks as shown in figure to the left.

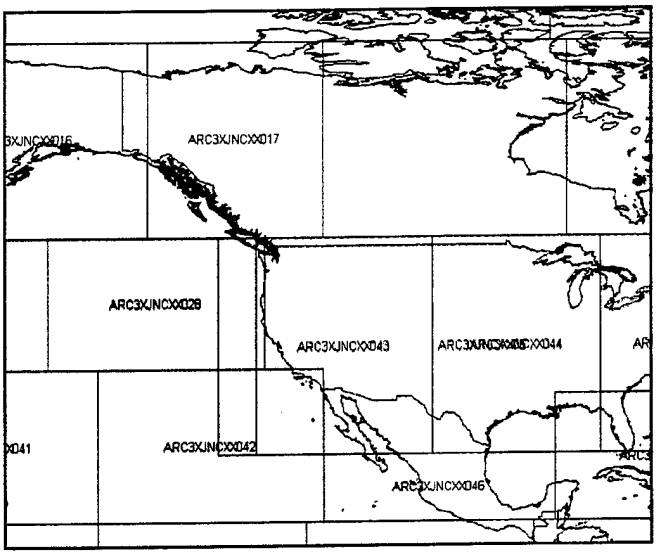


When you zoom in you can read the stock numbers.

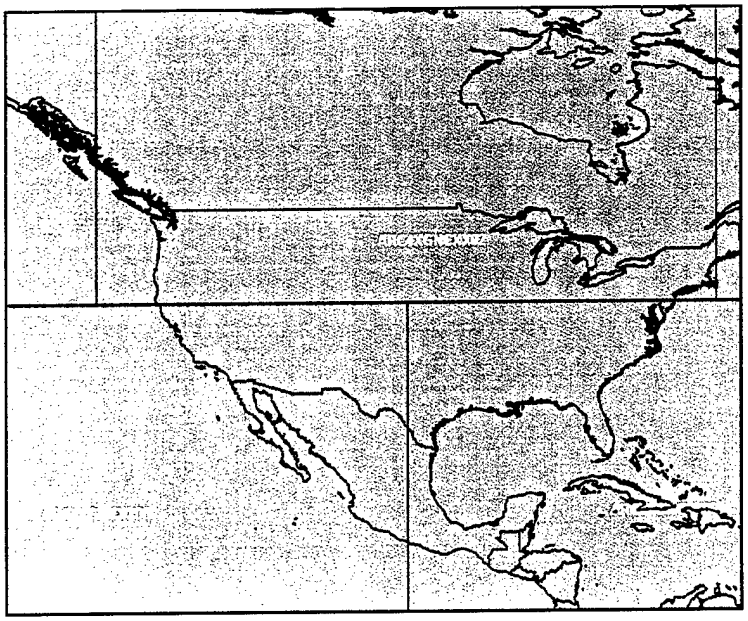
ARC3



Once again, it would appear there is no data available for parts of Canada.

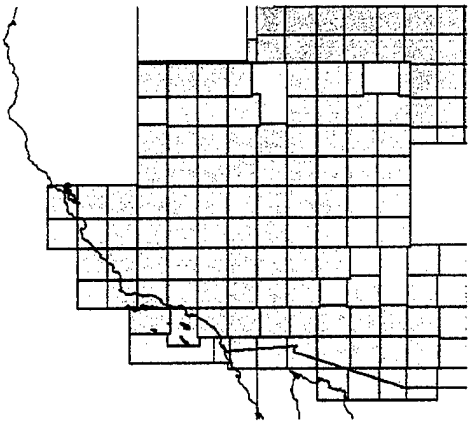


However, upon labeling and zooming in it looks as though there really isn't any data for Canada (lack of stock number).



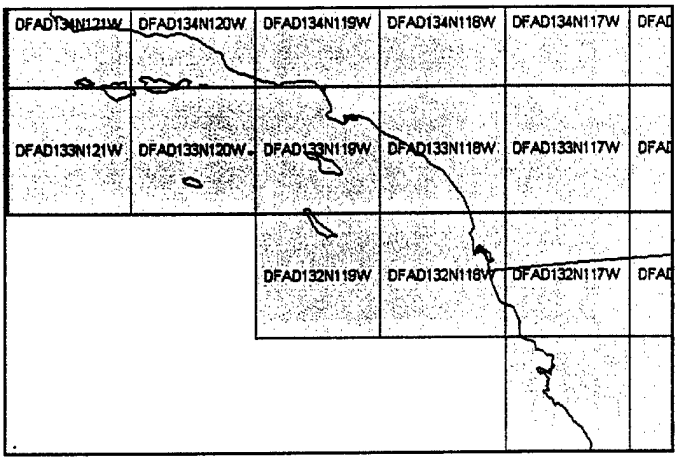
ARC4

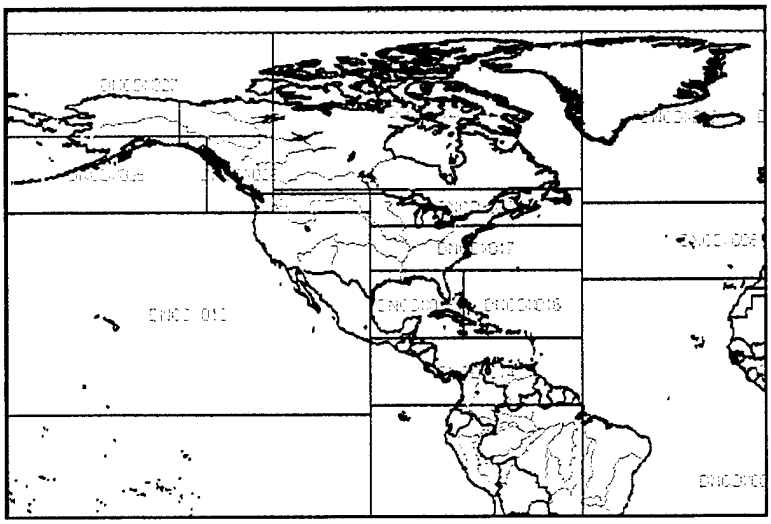
CIB



The CIB product coverage displayed both 5m (green) and 10m (aqua) CIB either by one-degree cell or CD CIB5 pink, CIB10 (yellow) contents. Since CIB is an RPF product, the coverage display should have had an additional level of granularity to the individual file. In this case, a one-degree cell of CIB does not represent a one-to-one relationship to its underlying file. Displaying CIB in available one-degree cells could be misunderstood to mean that CIB exists for the entire cell. This may not be the case in many instances. Both the CD and one-degree cell availability views are good, but a further level of detail is needed to sufficiently display the true CIB coverage. The *Identify* selection did provide stock number information regarding the CD from which a selected CIB cell (one degree cell) exists.

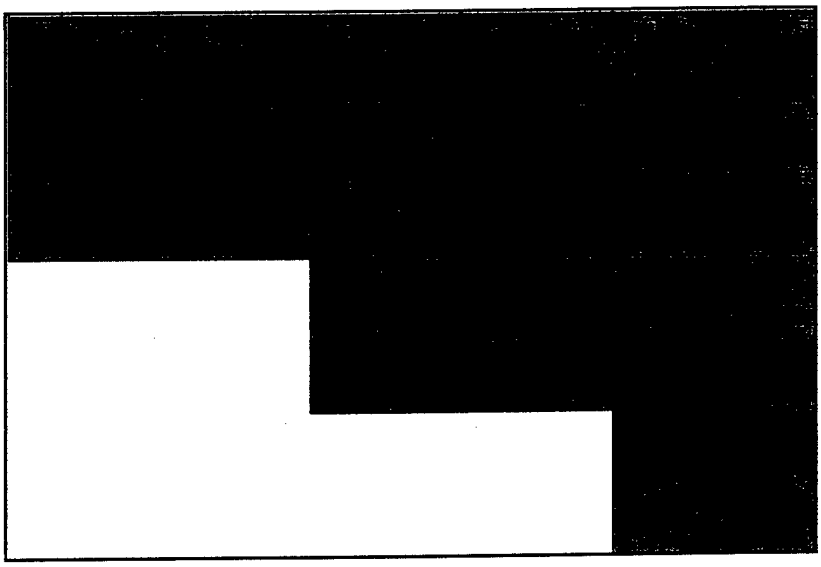
DFAD





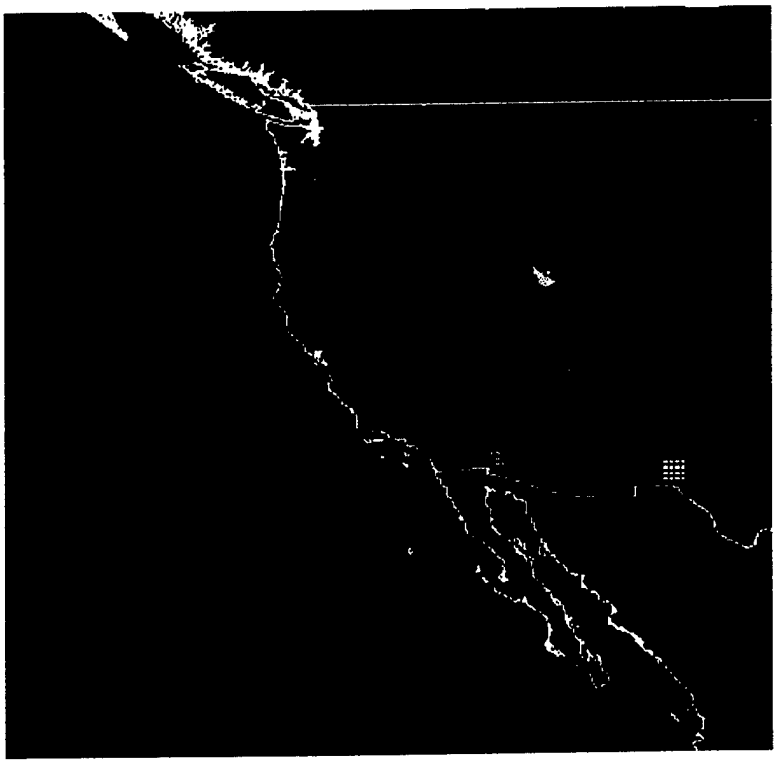
DNC

DTED



The DTED product coverage displayed each one-degree cell of data available worldwide for levels 1 and 2. For DTED level 1, a pop-up dialog showed the lat/long coordinate of the DTED when scrolling over the DTED cells. However, no pop-up dialog appeared when DTED level 2 was displayed. Also, when the *Identify* selection was used to display meta-data information regarding a particular cell, the stock number given appears to be incorrect. We would like to be able to identify which NIMA CD (either by stock number or NSN) based on an inquiry of a DTED cell. The level of detail (to the individual file) was excellent.

ITD / VITD



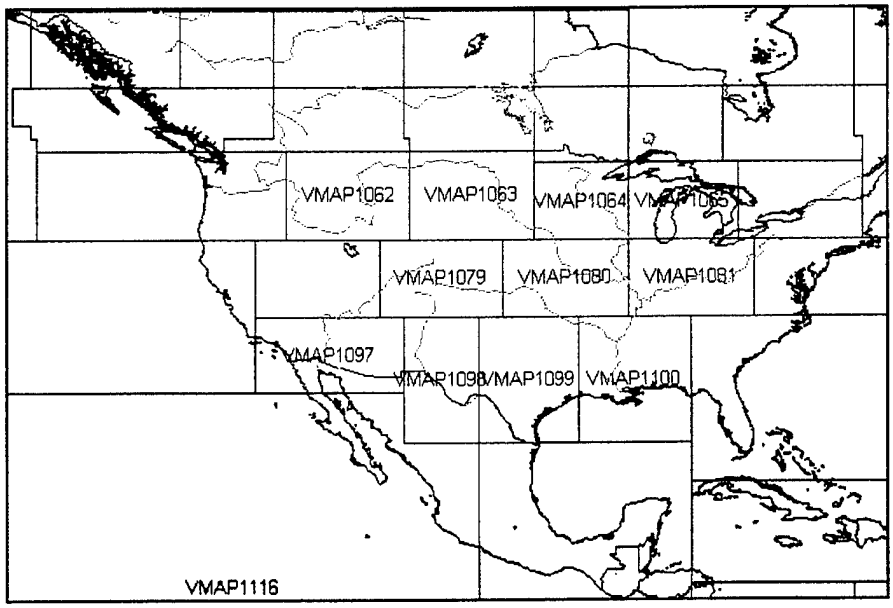
Something in the color scheme is overlaying a black layer. The obvious selections were the basetints (background), but these were turned off with no change to the display.

The coastal boundaries were also black and until changed to white, it was very difficult to see where you were.

The ITD / VITD data is barely visible with the black background.

VMAP1

Indicates a possible error in the data for the Great Lakes (e.g., should be coded as lakes vs. basetint coloring).

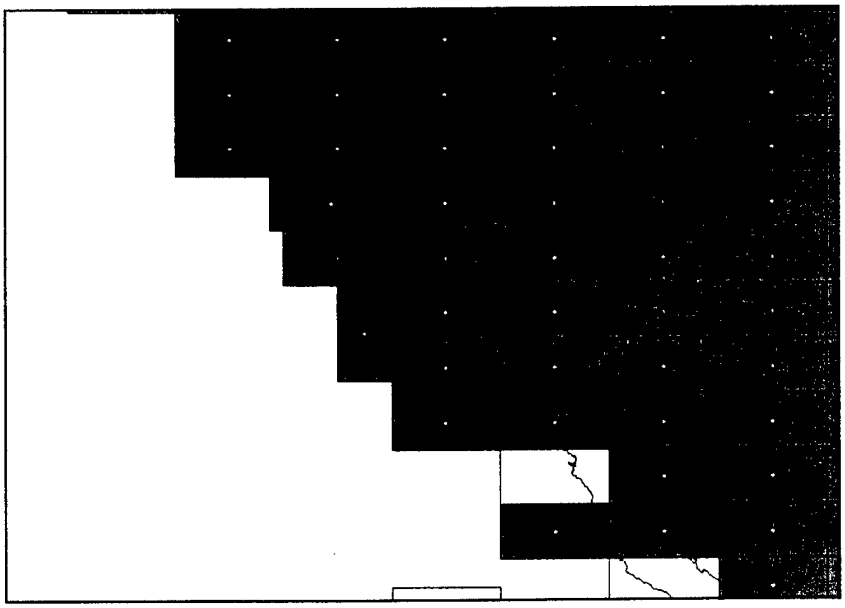


The VMAP product coverage did not provide stock number information using the *Identify* selection. The meta-data for this product was not clear.

2.4.3 Aeronautical Products

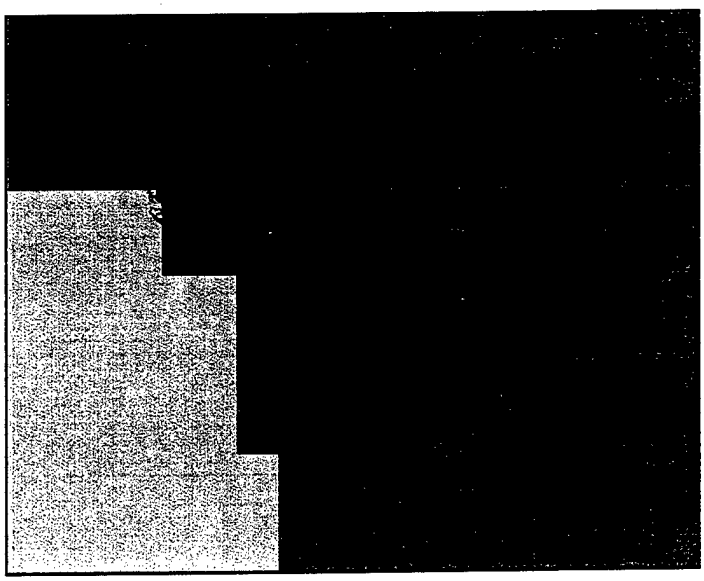
JOG A Series 1501

This figure shows the JOG – Air available for the California AOI. It is interesting to note that each of the white dots represents the stock number label point and when one hovers over the dot a stock number pops up. However, when the labels are turned on, not all the blocks have the stock numbers in them. This indicates a possible problem with incomplete attribute population.

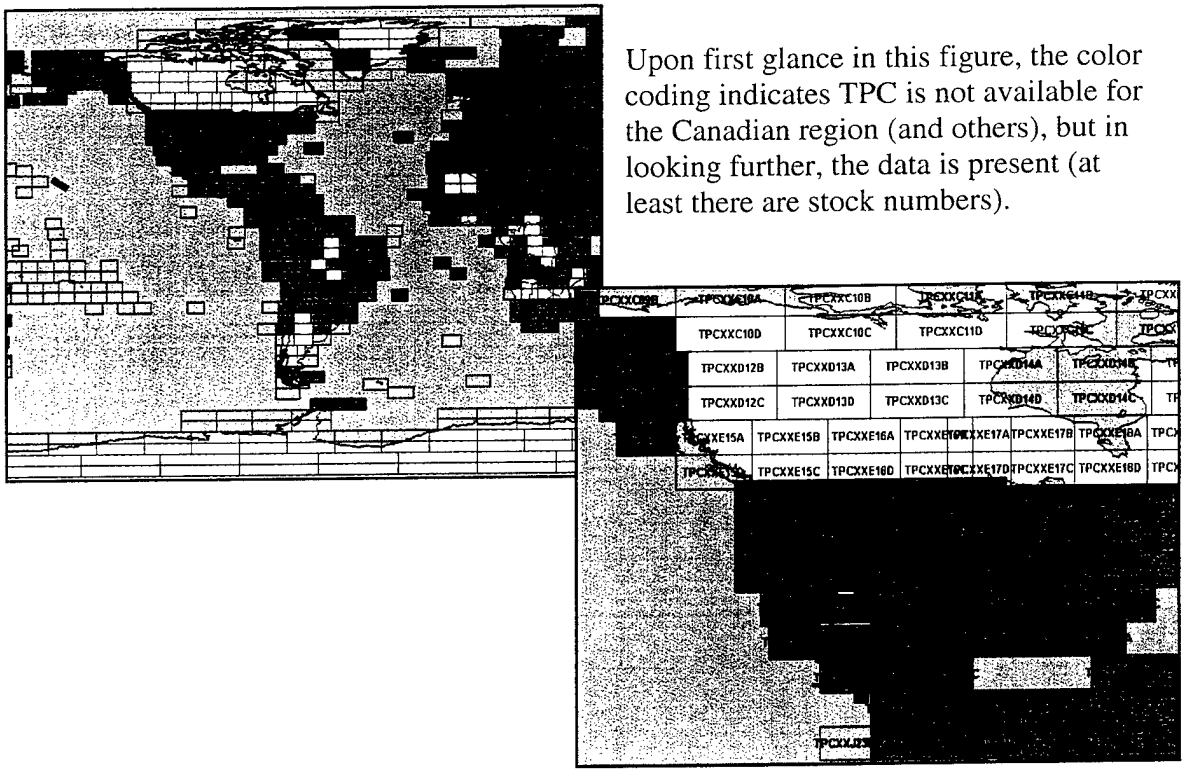


ONC

In contrast, the ONC view came up with the labels already showing. This was the first product that I didn't have to physically turn the labels on.



TPC

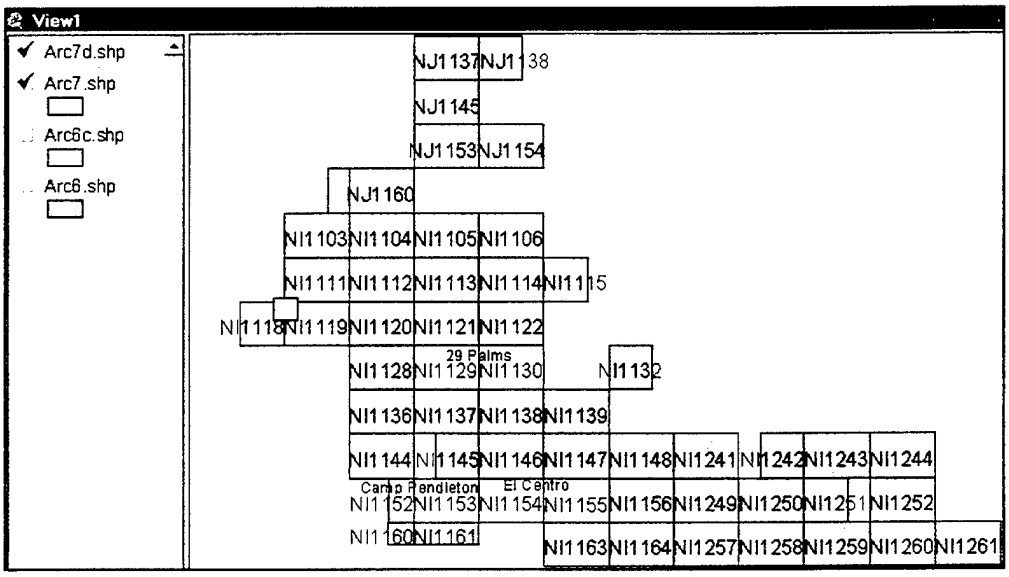


Upon first glance in this figure, the color coding indicates TPC is not available for the Canadian region (and others), but in looking further, the data is present (at least there are stock numbers).

2.5 ArcView Evaluation

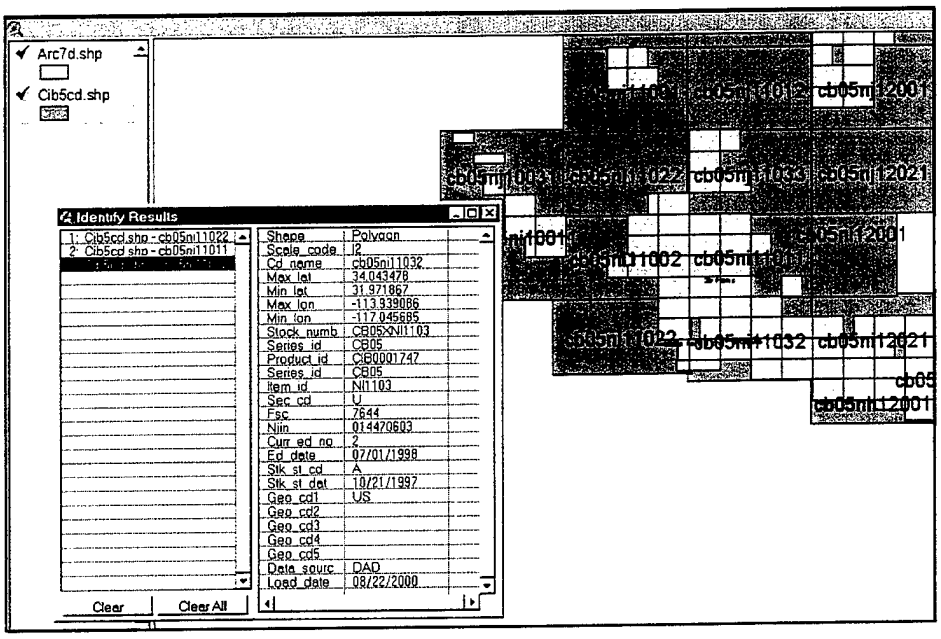
A brief review using ArcView 3.2 was done to look at the digital data presentation, once again using the California AOI. One of the first things noticed was that no extraneous data was provided (e.g., country and coastal boundaries, rivers, lakes, etc.) within the ArcView project file. The following figures show the ArcView presentations with the IDs labeled, and the areas of interest shown in text (added by user) due to the absence of coastal boundaries, etc. Lat/Longs were not visible in the ADRG ARC7 project file.

ADRG ARC7

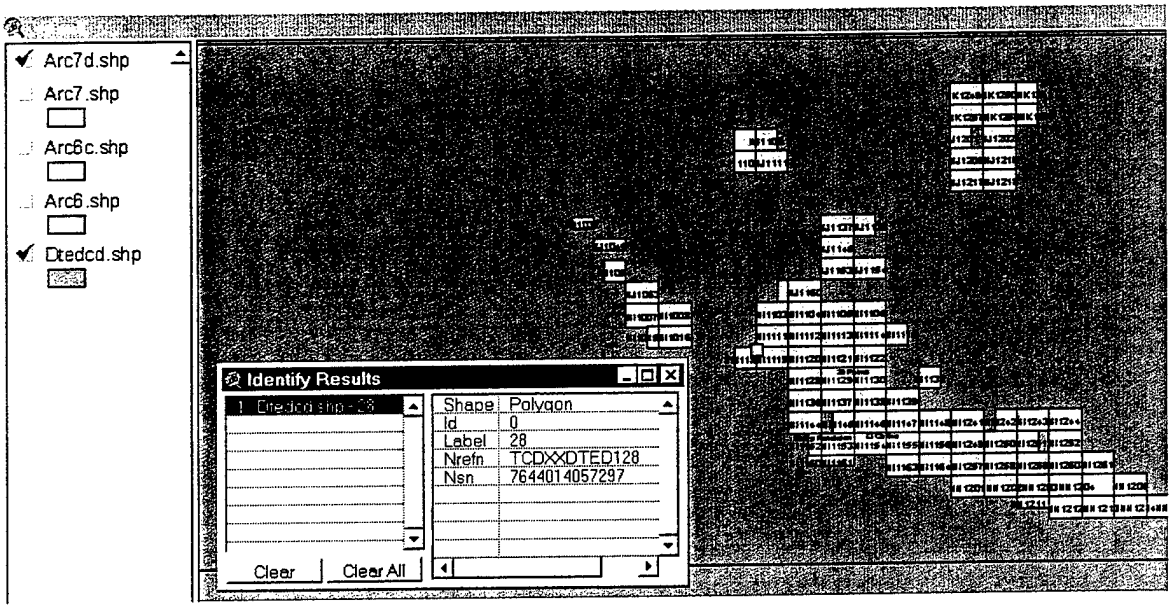


It was interesting to note the color block disappeared in the legend (upper left column) sometime during the procedure. There should be a khaki green block for the Arc7d.shp legend. Apparently the software toggled the hide/show legend button under Theme. This error was repeated numerous times throughout the review using ARC View.

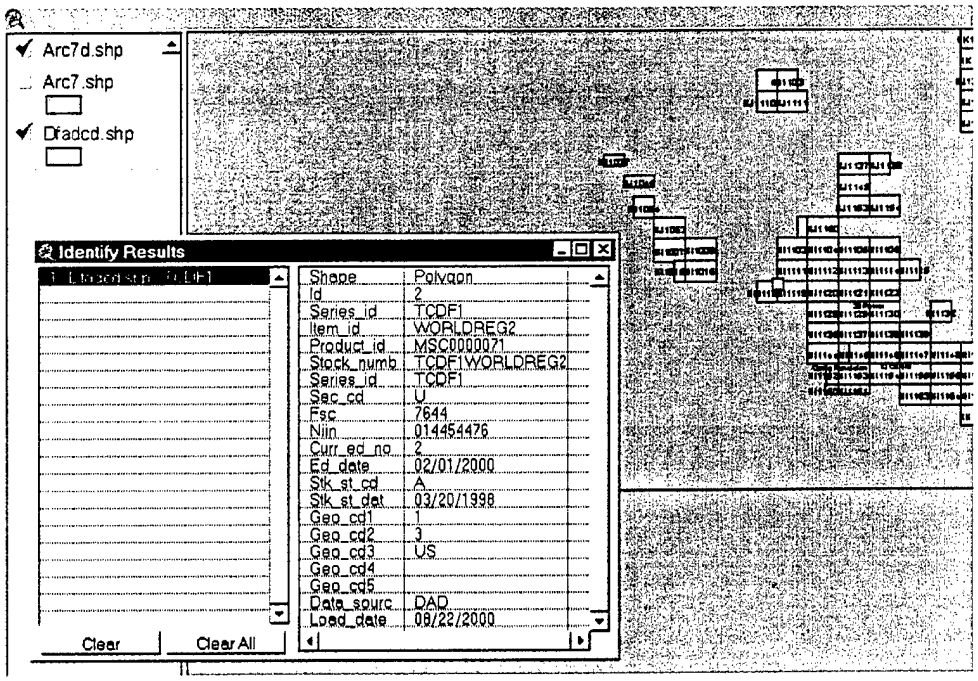
CIB


Arc7d.shp
Cib5cd.shp
Identify Results
1: Cib5cd.shp - cb05nl11022
2: Cib5cd.shp - cb05nl11011
Shape | Polygon
Scale_code | 2
Cd_name | cb05nl11032
Max_lat | 34.043478
Min_lat | 31.971867
Max_lon | -113.339086
Min_lon | -117.045685
Stock_numb | CB05XNL1103
Series_id | CB05
Product_id | CIB0001747
Series_id | CB05
Item_id | NL1103
Sec_cd | U
Fsc | 7644
Niin | 014470603
Curr_ed_no | 2
Ed_date | 07/01/1998
Stk_st_cd | A
Stk_st_dat | 10/21/1997
Geo_cd1 | US
Geo_cd2
Geo_cd3
Geo_cd4
Geo_cd5
Data_sourc | DAD
Load_date | 08/22/2000
Clear
Clear All

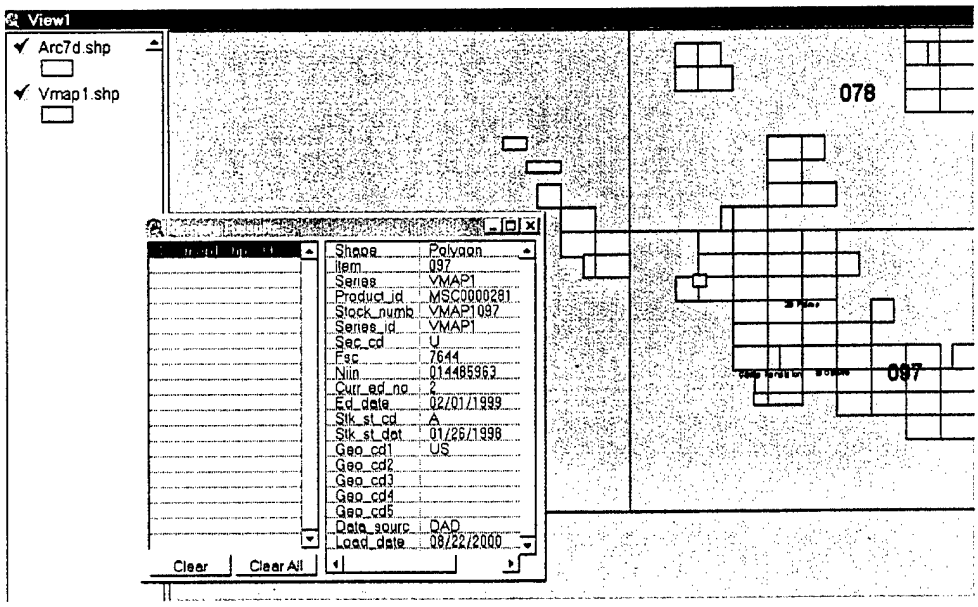
DTED


Arc7d.shp
Arc7.shp
Arc6c.shp
Arc6.shp
Dtedcd.shp
Identify Results
1 Dtedcd.shp - 28
Shape | Polygon
Id | 0
Label | 28
Nrefn | TCDXXDTED128
Nsn | 7644014057297
Clear
Clear All

DFAD



VMAP1



Differences Noted between using ArcExplorer and ArcView 3.2

A major difference in using ArcExplorer was that the software provided with the electronic catalog prototype automatically inserted countries, coastlines, cities, rivers, and lakes. This provided boundary lines and made it much easier to locate AOIs (as noted in figure 1).

3.0 Prototype Review Problems

3.1 Problems with Feature Selection based on DLA Approach

Three major shortfalls occurred in the use of ArcExplorer.

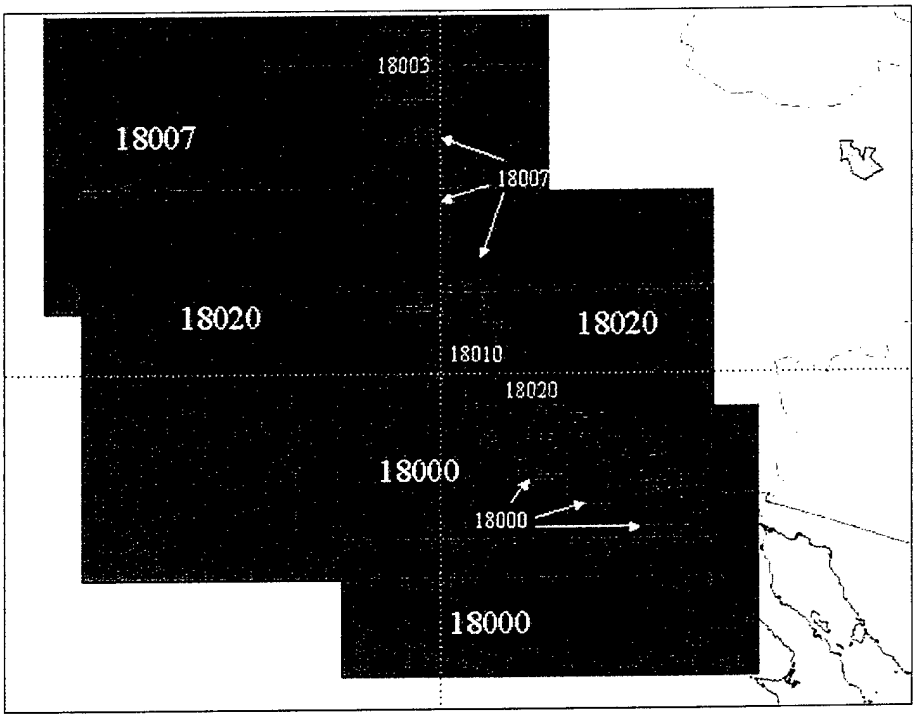
1. The inability to graphically select all features within an AOI (intersection of geometric sets, theme on theme selection).

2. The inability to automatically export selected feature elements and attributes.

ArcExplorer did provide one mechanism for the selection of features within a coverage (chart selection). This could be done with the use of the "query builder" and writing a Boolean or arithmetic expression for which a "true" condition would add the feature or chart to a list. It is possible to save this list to a file. This method is unfortunately not very useful since none of the attributes contain information related to the geographic extent of the chart coverage. Selections, however, could be constructed based on chart series, issue date, item_id etc.

3. The inability to recall more than one feature during a spatial query.

It frequently occurs with nautical charts that approach, coastal, and harbor charts will share some common geographical region. A spatial query in this case usually produces only one of the chart numbers and leads to user confusion. This is illustrated in the following figure.



3.2 Electronic Catalog Errors and Omissions Found

All of the html links were tested to verify that ArcExplorer module would launch and load the appropriate map index references plot. **Of the 367 links tested, 324 worked, while 43 failed.** The error messages generated during failure are listed in Section 3.2.1 in the comments section for each link. From these results it is obvious that the prototype needs corrective action in some of the work that has been completed to date.

Additionally, five of the aeronautical products (JOGs, ONCs, TPCs, JNCs and Special Purpose: COMBT) were not included in the prototype. We assume that these shortfalls will be corrected in a future prototype release.

3.2.1 Discrepancies Noted

The following table diagrams the hyperlink problems within the Aeronautical Products Section:

AERONAUTICAL PRODUCTS INTRODUCTORY SCREEN

Primary Link	Predecessor Link	Comments/Problem
Aero-Products Info ~E:/Html/aero frames.html	Part 1- Aeronautical Products ~E:/Html/aero.html	Left frame/Right frame reference to Standard Form 44 points to ~E:/documents/sfo344.frl but there is no standard windows viewer for .frl type links
AEInstall aeclient.exe	Prompted from paragraph text to install AE by "clicking here"	Missing hyper link
1. Aeronautical Product Coverage ~E:/projects/aero	List of products off main Aero Page ~E:/Html/aero.html	Wrong Pointer – Not pointing to an AE project-shows directory instead
Joint Strategic TPSC ~E:/Html/ssc.html	Aeronautical Product Coverages List - ~E:projects/aero.html	Missing ~E:/Html/ssc/seriestext.html under Series Description
Series Description (Cont. from above) ~E:/Html/ssc.html	Catalog Home ~E:/frontpage.html	Wrong Name for Hyper Link File ~E:/front_page.html
Tactical Pilotage Charts ~E:/projects/tpc.aep	Products List ~E:/projects/tpc.aep	AE Common Run Time Error 5 Invalid procedure called or bad argument. Application error-crashed ArcExplorer repeatedly
All Aero Products Coverage ~E:/projects/allaero.aep	Additional Aeronautical Products ~E:/Html/otheraero.html	Opens OK but embedded basemaps (i.e., world shoreline) Seem to hide some catalog data themes

There were four discrepancies noted during the data access as provided on the CD:

- No data available
- No access to internet server
- Missing files
- Overlapping polygons provided incorrect label information.

The following tables provide comments for each of the catalog products.

AERONAUTICAL PRODUCTS

Products	Comments
Joint Operations Graphics (1501 Series)	Description provided only; no data
Tactical Pilotage Charts (TPC)	Description provided only; no data
Operational Navigation Charts (ONC)	Description provided only; no data
Jet Navigation Charts (JNC)	Description provided only; no data

Special Purpose Products

Product	Comment
Test Range Instrumentation Maps (AIM)	OK
Korea Navigation / Training Chart (KNTC)	OK
Joint Strategic Target Planning Staff Charts (SSC)	OK
Joint Planning Charts (JPC) - Northern	jnc_north.aep file missing
Joint Planning Charts (JPC) - Southern	jnc_south.aep file missing
Eglin AFB Mosaics (EGMOS)	OK
Standard Index Charts (SIC)	OK
Oceanic Planning Charts (OPC)	OK
Edwards AFB Mosaics (EDMOS)	OK
West Coast Operational Chart (WCOAC)	OK
Azimuthal Equidistant Polar Charts (AEPC)	html/aeoc.html file missing
USAF Missile Planning Chart – Vandenberg AFB (RPC)	html/rpc.html file missing
Evasion Charts (EVC)	OK
Fallon Range Chart (FRC)	OK
USAF Aerospace Planning Charts (ASC)	OK
Utah Test Range Charts (UTR)	OK
Philippines Navigation / Training Charts (PNTC)	OK
Pensacola Training Area Chart (PTC)	OK
Nellis AFB Range Chart (NRC)	OK
Universal Jet Navigation Chart (JNU)	html/jnu.html file missing
Corpus Christi Training Area Chart (CCTAC)	html/cctac.html file missing
Kwajalein Atoll Area Chart (KAAC)	html.kaac.html file missing
Off-Base Disaster Map – Vandenberg AFB (OBDM)	html/obdm.html file missing; also the word disaster misspelled.

HYDROGRAPHIC PRODUCTS

Area	Chart Types	Comments
Region 1 - U.S. and Canada	Coastal Charts Harbor/Approach Charts Special Charts	Overlapping stock # problem.
Region 2 - Central and South America, Antarctica	Coastal Charts Harbor/Approach Charts Special Charts	Overlapping stock # problem.
Region 3 - Western Europe, Iceland, Greenland, Arctic	Coastal Charts Harbor/Approach Charts	Overlapping stock # problem.
Region 4 - Scandinavia, Baltic, Russia	Coastal Charts Harbor/Approach Charts Special Charts	All charts appeared as transparent color making it impossible to determine type of charts.
Region 5 - Western Africa, the Mediterranean	Coastal Charts Harbor/Approach Charts	Overlapping stock # problem.
Region 6 - Indian Ocean	Coastal Charts Harbor/Approach Charts	Overlapping stock # problem.
Region 7 - Australia, Indonesia, New Zealand	Coastal Charts Harbor/Approach Charts	Overlapping stock # problem.
Region 8 - Oceania	Coastal Charts Harbor/Approach Charts Special Charts	Harbor/Approach and Special Charts did not have stock # problem. Coastal charts did.
Region 9 - East Asia	Coastal Charts Harbor/Approach Charts Special Charts	Ok.

Miscellaneous Charts

WOPZC	General Nautical Charts	Ok. Only 1 polygon shown.
WOPZP	General Nautical Charts	Ok. Only 1 polygon shown.
WOXGN	General Nautical Charts	Overlapping stock # problem.
WOAGN	General Nautical Charts, International Chart Series	Overlapping stock # problem.
WOBGN	General Nautical Charts	Overlapping stock # problem.
WOPGN	General Nautical Charts	Overlapping stock # problem.
WOBZC	General Nautical Charts, Reference Charts	Ok. Only 1 polygon shown.
WOBZP	Plotting Diagrams	Ok. Only 1 polygon shown.
WOXZP	General Nautical Charts, Display Plotting Charts, Mediterranean Sea Wall Charts, Plotting Diagrams	Overlapping stock # problem.
WOAZC	Great Circle Sailing Charts	Overlapping stock # problem.
WOXZC	Great Circle Tracking Charts, Geophysical Data Charts	Overlapping stock # problem.
COMBT	Combat and Combat Training Charts	No charts available for preview.

TOPOGRAPHIC PRODUCTS

Chart Types	Series Description (All these briefing products should be in one project file (chart type) as separate coverages.)	Comments
World Small Scale (1:1M)	1105	Invalid Database error
	1106	Invalid Database error
	1107	Invalid Database error
	1144	Invalid Database error
	1145	Invalid Database error
	1146	Invalid Database error
	1147A/B	Invalid Database error
	1148	OK
	1150	OK. Problem with "map tip" - ID rightmost sections (i.e., Australia, Japan).
	1151	OK
	1152	OK
	1153	Invalid Database error
	1211S	OK
	1308	OK
	1310S	OK
	2201	OK
	2301	OK
	5213	OK
	8205	Invalid Database error
Medium Scale (1:250K)	1501	OK Map tip set incorrectly to ?? the sheet number or codes.
	1501A	OK
	1501S	OK
	K502	Possible problem with stock number
	U542	Possible problem with stock number
	W532	Possible problem with stock number
TLM 1:100K	U611	OK
	P643	Invalid Database error
	H632	OK
	H632Z	OK
	H604	OK
	G682	OK
	J601Z	Cannot open internet site
	L6015	OK
	E671	OK
	E6712	OK
	Z624	Cannot open internet site
	G674	OK
	M618	Cannot open shapefile t_100k
	Y627	OK
	Y621	Cannot open internet site
	J621Z	Cannot open internet site
	P673	OK

Chart Types	Series Description (All these briefing products should be in one project file (chart type) as separate coverages.)	Comments
	M642	OK
	M645	OK
	M648	OK
	K653	OK
	K643	OK
	K637	OK
	Y632	Cannot open internet site
	L654	OK
	K6614	OK
	K661	OK
	K668	OK
	U622	OK
	E663	Cannot open internet site
	H642	OK
	H642	OK
	J632	OK
	J632Z	OK
	N6011	OK
	N609	OK
	K663	OK
	K6613	OK
	Y629	Cannot open internet site
	Y630	Cannot open internet site
	Y614	OK
	M19	OK
	P652	OK
	Y635	OK
	K6617	Cannot open internet site
	K668	Cannot open internet site
	E683	OK
	G626	OK
	K667	OK
	K669	OK
	Z624	Cannot open internet site
TLM 1:50K	M7020	OK
	P741S	OK
	P743	OK
	Z731	OK
	N701	Invalid Database error
	N707	Invalid Database error
	R712	OK
	M771	OK
	M712	Invalid Database error
	M783	OK
	N701	Invalid Database error
	N751	Invalid Database error
	M736	OK
	M737	OK
	H731	OK
	M709	Invalid Database error

Chart Types	Series Description (All these briefing products should be in one project file (chart type) as separate coverages.)	Comments
	H702	OK
	M704	OK
	U741	OK
	U744	OK
	Z724	OK
	L7016	OK
	G772	OK
	G781	OK
	G782	OK
	G701	OK
	L7001	OK
	L7021	OK
	L737	OK
	L784	OK
	L781	OK
	L743	OK
	L733	OK
	Z703	OK
	Z725	OK
	Z901	OK
	M761	OK
	E763	OK
	M709	Invalid Database error
	E724	OK
	K717	OK
	M774	OK
	M715	OK
	E733	OK
	E931	OK
	J721	OK
	J722	OK
	P773	OK
	P777	OK
	E753	OK
	Y722	Invalid Database error
	N701	OK
	N753	OK
	Y722	Invalid Database error
	M713	Invalid Database error
	M761	OK
	M762	OK
	M709	Invalid Database error
	N701	OK
	N707	OK
	M745	OK
	W743	OK
	E754	OK
	E754Z	OK
	G745	OK
	E732	OK

Chart Types	Series Description (All these briefing products should be in one project file (chart type) as separate coverages.)	Comments
	W733	OK
	E752	OK
	E752Z	OK
	E952	OK
	C761	OK
	C762	OK
	U753	OK
	T725	OK
	K753	OK
	L858	OK
	K758	OK
	K743	OK
	K745	OK
	K739	OK
	M792	OK
	L765	OK
	L774	OK
	L773	OK
	L775	OK
	L776	OK
	L791	OK
	T725	OK
	K737	OK
	L754	OK
	L7015	OK
	N701	OK
	N752	OK
	K724	OK
	G744	OK
	P761	OK
	P761S	OK
	N701	OK
	N751	OK
	M709	Invalid Database error
	G722	OK
	W743	OK
	G723	OK
	F701	OK
	N701	OK
	M761	OK
	M709	OK
	P733	OK
	P734	OK
	M733	OK
	E751	OK
	G731	OK
	G764	OK
	L754	OK
	M711	OK
	K763	OK

Chart Types	Series Description (All these briefing products should be in one project file (chart type) as separate coverages.)	Comments
	U722	OK
	U726	OK
	S721	OK
	E761	OK
	E762	OK
	E762S	OK
	H741	OK
	J731	OK
	S701	OK
	S733	OK
	S711	OK
	S752	OK
	S721	OK
	S742	OK
	M751	OK
	M753	OK
	M782	OK
	E735	OK
	K763	OK
	M705	OK
	L761	OK
	N701	OK
	N7011	OK
	N707	OK
	Z723	OK
	G726	OK
	L716	OK
	K7620	OK
	K763	OK
	K769	OK
	M709	OK
	G742	OK
	M774	OK
	M709	OK
	Z784	OK
	L754	OK
	M781	OK
	M783	OK
	Y712	OK
	E795S	OK
	M716	OK
	K723	OK
	K725	OK
	L7001	OK
	N709	OK
	Y745	OK
	L7017	OK
	E742	OK
	W743	OK
	P751	OK

Chart Types	Series Description (All these briefing products should be in one project file (chart type) as separate coverages.)	Comments
	P752	OK
	N707	OK
	N709	OK
	Y737	OK
	N701	OK
	K763	OK
	V744	OK
	Q701	OK
	Q701S	OK
	V789	OK
	V789S	OK
	V784	OK
	V784S	OK
	V795	OK
	V795S	OK
	V777	OK
	V777S	OK
	V716	OK
	V747	OK
	V745	OK
	V745S	OK
	V733	OK
	V793	OK
	V763	OK
	V751	OK
	V751S	OK
	V778	OK
	V778S	OK
	V753	OK
	V753S	OK
	V785	OK
	V711	OK
	V733	OK
	V714	OK
	V714S	OK
	V762	OK
	V762S	OK
	V772	OK
	V772S	OK
	V743	OK
	V779	OK
	V796	OK
	V712	OK
	V722	OK
	V722S	OK
	V781	OK
	V781S	OK
	V721	OK
	V721S	OK
	V742	OK

Chart Types	Series Description (All these briefing products should be in one project file (chart type) as separate coverages.)	Comments
	V752	OK
	V752S	OK
	V783	OK
	V783S	OK
	V792	OK
	V731	OK
	V731S	OK
	V735	OK
	V715	OK
	V746	OK
	V746S	OK
	V741	OK
	V741S	OK
	V782	OK
	V782S	OK
	V782	Cannot open internet site
	V797	OK
	V734	OK
	V734S	OK
	V791	OK
	V791A	OK
	V754	OK
	V761	OK
	V761S	OK
	V774	OK
	E785	OK
	L7014	OK
	G726	OK
	M709	OK
	Z703	OK
	Z725	OK
	Z744	OK
	Z745	OK

DIGITAL PRODUCTS

Of the 28 digital products listed in the prototype, there were nine products that had no data available for viewing:

DTOP **DVOF** **DAFIF** **APG** **DPPDB**
GIP/GAP **DATI** **CIG** **DBDB**

WVS Plus was absent entirely (it is included in the Part 7, Volume 1 Digital Data Products catalog).

The following table indicates problems found when opening the data. As with the other data products, the two errors found were missing files and lack of data availability.

Product	Comment
ARC2 – TPC	OK
ARC3 – JNC	OK
ARC4 – GNC	OK
ARC5 – 1501A	arc5.aep file missing
ARC6 – 1:100K TLM	OK
ARC7 – 1:50K TLM	OK
ARC9 – City Graphics	OK
CADRG	cadrg.aep file missing
DTED	OK
DFAD	OK
DTOP	No data available for viewing
DVOF	No data available for viewing
AAFIF	Servers not available
DAFIF	No data available for viewing
CAC	OK
APG	No data available for viewing
DPPDB	No data available for viewing
GIP/GAP	No data available for viewing
CIB	OK
DATI	No data available for viewing
ITD	OK
VITD	OK
FFD	Servers not available
CIG	No data available for viewing
DNC	OK
DBDB	No data available for viewing
VMAP	OK
UVMAP	OK

4.0 Recommendations

- Customize the ArcExplorer interface to permit the specification of an AOI by one of several methods:
    - Manual entry of lat/long coordinates of a bounding box
    - Entry via windows-interactive box draw
    - Entry by country name.
    - Entry by semi-automatic generalized polygon drawing.
- Provide automated preparation of order to be sent via Internet transmission or fax.
- Consider access to data via Internet as well as CD-ROM.
- Include all CADRG Updates and monthly DAFIF releases on the CD.
- Provide software capability to automatically detect user's default web browser
- Provide Lat/long grids/graticule.
- Base map improvement: Provide more detail at larger scales of 1:100K and 1:50K; detail display should be enabled/disabled depending on map view scale.
- Check overlapping polygon attribute information problem.
- Add level of granularity to CIB data coverage display.
- Check color coding of black layer basetint on ITD/VITD data.
- Provide stock number information for the *Identify* section of VMAP.
- Enhance ArcExplorer interface to provide capability of overlapping multiple data products (e.g., ARC7 with CIB).
- Verify supposed missing data is truly missing or coded incorrectly.
- Check coding of Great Lakes region (appears to be coded as ocean area vice lakes).
- Verify complete population of all attributes.
- Verify attribute information is consistent to what is shown.
- Provide capability to export selected feature elements and attributes to other files.
- Verify all files and links operational.
- Provide a "series field" for the hydrographic attribute tables (if data is available).

5.0 Summary and Conclusions

The Defense Logistics Agency is to be commended for their initial efforts in moving the tedious and error-prone manual map ordering process toward a computer-assisted/ automated method. This prototype represents a large effort on DLA's part and the difficulties encountered by this review are to be expected in a project of this magnitude. While not yet where it needs to be, this prototype does represent a welcomed step in a positive direction. With additional emphasis given to selecting all NIMA products via "area of interest" designation and automated order preparation, this project will yield a significant improvement in the "map" ordering process.

6.0 Acknowledgments

The Oceanographer of the Navy (N096) funded this effort to evaluate the DLA digital products catalog. Under the direction of LCDR Karen Ruppe, NRL Code 7440 has followed a concise set of evaluation criteria to determine the potential benefits and shortfalls of this prototype digital MC&G product. This evaluation, funded under Program Element 0603704N is a part of the Naval Digital Mapping, Charting, and Geodesy Analysis Program's (DMAP) long-term focus of enhancing the Navy and Marine Corps' use and development of digital MC&G technologies. DMAP greatly appreciates the ongoing efforts of Dr. Edward Mozley, SPAWAR Program Manager.